GENESIS
DISPLAY PERFECTION

FEEDBACK ON ENERGY STAR DRAFT PECIFICATIONS FOR COMPUTER MONITORS

The following are some of the suggestions for defining the standards and test criteria made by Genesis Microchip in order to qualify a monitor for ENERGY STAR complaint. Genesis Microchip is a display processor manufacturer for digital display segment. Suggestions made here are on our experience working with all kinds of digital display units. In particular the following items are applicable only to LCD monitors not for CRT's.

We stand on majority of attendees who believe in having separate specifications for CRT and LCD monitors.

Power Management:

On Mode: The power requirement when the monitor is connected to power source and producing image on the display screen.

Comments: The pixel per watt approach is better than square inch per watt. The On mode power consumption equation Y (watts)= 30+20X(mega pixels) is sufficient to qualify most of the LCD monitors which, supports only one Analog or DVI input. However this is too tight in larger size, low-resolution monitors with multimedia support. Ex.20inch VGA monitors.

Reasons:

1: Any components associated with video and audio functionality like Video decoder, video De-interlacer, TV tuner and Audio amplifier consume more power than the Display processor used alone to scale and display the input signal.

2: The lamps to light up larger panels consume more power compared to the lamps used in smaller size panels. Typically the larger panels consume 5 ~6 Watts per lamp compared to 3~4 Watts per lamps used in smaller ones.

Energy Star should collect real data from the monitor manufacturer before drawing final conclusion on this.

Test Criteria:

1. On Mode power should be measured at the AC power supply source.
2. The average power measurement readings over a specified measurement time should be considered.
3. The measurement should be made under the default settings of brightness and contrast, which qualifies the Energy Star Ergonomics specifications.
4. The LCD must set either at the native resolution or at the maximum supported input resolution and refresh rate.
5. The measurement should be conducted with a Full screen display and with critical patterns like Alternative black and white pixels (Not alternative black and white lines) or 2 pixel white 2 pixel black (With dual pixels per clock panels this pattern causes maximum panel data switching).
6. The monitor must be sufficiently warm up before the measurements are taken. Approximately 20 minutes after power on.

Sleep Mode: The reduced power state the monitor enters after receiving instructions from the computer.

Comments: Moving to single sleep mode as proposed in the draft is most acceptable. However the proposed power consumption less than 4 Watts must be made strict to those monitors used only for graphics applications not for the multimedia monitors.
The difficulty with any monitor controller is, in sleep mode a portion of the hardware is powered in order to monitor the user interaction or signal insertion. In case of multimedia monitors the overhead is much higher. All the audio and video devices, a portion of them are powered during sleep. So, it is very important to specify the test conditions where all the peripherals like TV tuner, Audio and Video devices and ones on USB connector should be disconnected or turned off. Otherwise a separate section should be included for multimedia monitor power consumption.

Test Criteria:

1. Sleep Mode power should be measured at the AC power supply source.
2. The average power measurement readings should be considered
3. All audio, video and USB devices should be turned off.
4. The monitor must be in proper sleep state before measurements are made. The default time of less than15 minute is acceptable.
5. Criteria to enter the sleep mode should be included. Whether the signal cable must be removed or the reference signals (sync signals or clock) states must be monitored?
6. As a general practice all monitors enter the sleep mode in either of above conditions. In later case, it is very important to define the exact conditions to enter the sleep mode. Since analog interface monitors have to respond to the VESA DPMS states and digital interface monitors should respond to DVI digital Monitor Power Management (DMPM) conditions.
7. When the monitor is under sleep mode it is necessary to indicate this state by specific LED indications. Ex. Turning RED or ORANGE LED.
8. The sleep mode recovery time (less than 5 seconds) should include only the monitor recovery time after the monitor controller sees a stable reference signal from the signal source (PC). The recovery time should exclude PC recovery time.

Off Mode: The Power being used when the monitor is connected to power source, but the monitor is switched off.

Comments: More than half of the LCD monitors shipped today uses 12V DC power supply. The efficiency of the 12V power brick decides the off mode power consumption. The Off Mode power (less than 2W) suggested in the draft might be a serious concern in this case.

Visual Ergonomics:

Luminance (Brightness): Luminance intensity per unit area projected in a given direction. The minimum brightness suggested in the draft 100 nits (candelas/Square meter) is acceptable for all LCD monitors.

Test Criteria:

1. The LCD monitor must be set with the manufacturer specified default brightness, contrast and color settings.
2. The measurement should be executed in a stable windless and dark room. 30 minutes after lighting the backlight under controlled room temperature.
3. Test image should be full screen white, no over saturated areas on the display

4. Measurement should be taken with a standard photometer having minimum acceptance angle permitting accurate readings Ex. Minolta LS –100, LS-110, TOPCON BM-5A, BM-7.
5. While taking the readings the photometer should be placed perpendicular to the center of the LCD monitor with a minimum distance from the monitor as specified in user manual.

Contrast Ratio: The ratio of luminance level of brightest image to the luminance level of darkest image that can be produced on the LCD monitor.

The minimum contrast ratio specified in the draft (200:1) is acceptable for all LCD monitors.

Test Criteria:

1. The LCD monitor must be set with the manufacturer specified default brightness, contrast and color settings.
2. The measurement should be executed in a stable windless and dark room. 30 minutes after lighting the backlight under controlled room temperature.
3. Test image should be full screen white (All pixel white) and full screen black (All pixel black).
4. Measurement should be taken with a standard photometer having minimum acceptance angle permitting accurate readings Ex. Minolta LS –100, LS-110, TOPCON BM-5A, BM-7.

While taking the readings the photometer should be placed perpendicular to the center of the LCD monitor with a minimum distance from the monitor as specified in user manual.